Profiling surface glycans and glycoprotein expression of human embryonic stem cells

Grant Award Details

Profiling surface glycans and glycoprotein expression of human embryonic stem cells

Grant Type: SEED Grant

Grant Number: RS1-00365

Investigator:

Name:	Carolyn Bertozzi
Institution:	University of California, Berkeley
Type:	PI

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $444,847

Status: Closed

Progress Reports

Reporting Period: Year 2

View Report

Reporting Period: NCE

View Report

Grant Application Details

Application Title: Profiling surface glycans and glycoprotein expression of human embryonic stem cells

Public Abstract: Human embryonic stem cells can be changed into virtually any cell type in the adult body. Because of this unique capability, these cells have the potential to cure a vast majority of existing human disorders. Several hurdles exist, however, which need to be overcome before results from the exciting field of stem cell research can be used in the clinic. For example, the factors which govern conversion of stem cells into a variety of tissue types that may find uses in regenerative medicine such as in liver, heart, brain, are not well understood. Our research employs a unique multidisciplinary and collaborative approach to harness the expertise of several leading scientific laboratories to bridge this information gap. In particular, our area of specialization is in understanding how the sugars which coat the surfaces of cells impact processes such as the malignant transformation of cancer cells. The CIRM grant will enable us to apply this same accumulated expertise to study the roles of cell surface sugars in the transformation of human embryonic stem cells into cell types useful for the treatment of human diseases.

Statement of Benefit to California: Programs funded by CIRM and other state granting agencies will allow California to continue to be at the frontier of stem research for the development of new treatments to cure human diseases. Research such as ours will hopefully enable modern medicine to access exciting new areas such as spinal regeneration, and finding treatments for neurodegenerative disorders for which there is currently little hope for curing. Some illnesses which could be potentially impacted include multiple sclerosis, Alzheimer's, Parkinson, and Batten diseases. Human embryonic stem cells can be changed into virtually any cell type in the adult body. Several hurdles exist, however, which need to be overcome before results from the exciting field of stem cell research can be used in the clinic. For example, the factors which govern conversion of stem cells into a variety of tissue types that may find uses in regenerative medicine such as the liver, heart, and brain, are not well understood. Our research employs a unique multidisciplinary and collaborative approach to harness the expertise of several leading scientific laboratories in the state of California to bridge this information gap. In particular, our area of specialization is in understanding how the carbohydrates which coat the surfaces of cells impact processes such as the malignant transformation of cancer cells. Carbohydrates densely coat the surfaces of all human cells and as such provide the first contact point for communication of the cell with its environment. For this reason, studies of cell surface carbohydrates have powerfully accelerated medical advances in other fields. We now seek to apply investigations of these carbohydrates to the emerging area of stem cell research. Through initiatives like CIRM, California will continue to lead the nation in the discoveries resulting from collaborative scientific research which will fuel tomorrow's medical advances.
